USGS

**WATER RESOURCES RESEARCH GRANT PROPOSAL**

**Project ID:** 2002MT1B

**Title:** The effectiveness of burn-area emergency rehabilitation (BAER) techniques in reducing post-fire soil erosion on the Sula state forest in western Montana.

**Project Type:** Research

**Focus Categories:** Geomorphological Processes, Hydrology, Sediments

**Keywords:** soil erosion; forest fire; burn-area emergency rehabilitation.

**Start Date:** 05/01/2002

**End Date:** 04/30/2003

**Federal Funds Requested:** $18,503

**Non-Federal Matching Funds Requested:** $37,074

**Congressional District:** at large

**Principal Investigator:**
Scott Woods
University of Montana

**Abstract**

Erosion rates from undisturbed forest soils are typically very low, but substantial increases in soil erosion have been documented after fires. These increases are a concern because of the risk to life and property due to debris flows, the loss of productivity due to soil loss, and the adverse effects of increased sediment production on water quality and habitat in downstream water bodies. An objective of burn area emergency rehabilitation (BAER) is to reduce the risk of these types of environmental and economic impacts by implementing various erosion control techniques. Due to a general increase in the number and severity of fires, BAER related spending has increased substantially in recent years. The general public concern over the human and environmental impacts of forest fires means that BAER expenditure is likely to remain high for the foreseeable future. However, despite the huge amount of money spent on BAER projects, very few studies have quantitatively evaluated the effectiveness of the erosion control techniques that are being used.

The proposed research will evaluate the effectiveness of the post-fire erosion control techniques that were implemented on the Sula state forest in western Montana after a major fire in 2000. Almost 15000 acres of land were burned, and erosion control techniques have included aerial seeding and contour logging. The effectiveness of these erosion control techniques will be evaluated by comparing erosion rates in similar treated and untreated areas. Silt fences will be installed to obtain spatially and temporally aggregated measurements of erosion rates at the hillslope scale under natural rainfall conditions. Small (1m2) and large (40 m2) plot rainfall simulator experiments will be conducted to measure erosion rates under controlled conditions, where the precipitation amount and intensity and the contributing drainage area are well defined. The small plot rainfall simulations will be used to evaluate spatial variability. The large plot simulations will provide critical spatially integrated measurements of erosion rates at the hillslope scale. Variability in erosion rates due to differences in soil texture, water repellency, cover density and slope will be evaluated in order to identify situations where the two treatments are and are not effective. This research will result in an increased understanding of the relative effectiveness of two of the more commonly used post-fire erosion control techniques.